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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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08/994,758 12/19/97 NISHI

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EXAMINER

MM91/0328

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MATHEWS, A
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Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.
08/994,758

Applicant(s)
NISHI

Examiner
Alan Mathews

Group Art Unit
2851



☒ Responsive to communication(s) filed on Oct 6, 2000 and Dec 5, 2000 and Dec 7, 2000 and Jan 12, 2001

☐ This action is FINAL.

☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

☒ Claim(s) 1-39, 41-43, 45, 48-55, 68-70, 72-74, 76, 79-84, 96-99, 101-103, 105, 108-115, 128-149, 156-163, 168-171, 179-189 are pending in the application.

Of the above, claim(s) 101-103, 105, 108-115, 128-149, 156, 157, 168, 179-183, 187-189 is/are withdrawn from consideration.

☒ Claim(s) 1-8, 23-28, 35-39, 41-43, 45, 48-55, 68-70, 72-74, 76, 79-84, 97-99, 101-103, 105, 108-115, 128-149, 156, 157, 168, 179-183, 187-189 are allowed.

☒ Claim(s) 9-11, 15, 21, 29-31, 33, 34, 96, 143-149, 158-163, 169-171, 183-186 are rejected.

☒ Claim(s) 12-14, 16-20, 22, and 32 is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☒ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been

☐ received.

☒ received in Application No. (Series Code/Serial Number) 08/377,504.

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☒ Notice of References Cited, PTO-892

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

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DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 96, 183-186 and 188 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In claim 96, it is not clear how the product can be made by the steps in claim 86, since no exposing step is recited. Furthermore, the circuit element recited in claim 96 has not been structurally correlated with any of the elements in claim 68. In claim 183, lines 4-6, the functional language "thereby exposing sequentially each of a plurality of defined regions on said second object" is not supported by sufficient structural recitation to warrant the presence of the functional language. Simply having a first and a second object move relative to an exposure beam does not, by itself, produce the result of "exposing sequentially each of a plurality of defined regions on the second object". In addition, in claim 183, lines 9 and 11, "an object side" and "the object side" is confusing, since a first and second object have been previously recited. Is the term "object" referring to the first and second object, or is it referring to something

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else. With respect to claim 188, it is not clear what product is made by "using" the apparatus of claim 37. In other words, it is not clear what are the limitations of the product claim ¹⁸⁸~~37~~ or what are the metes and bounds of the product of claim 188 [see MPEP 2173.05 (q)].

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 15, 21, 34, 143, 144, 146, 147, 149, 158, 159, 161, 162, and 169-171 are rejected under 35 U.S.C. 102(b) as being anticipated by the Japanese Patent document 63-128713. The Japanese Patent document 63-128713 discloses in figure 1 and page 6, lines 21-25, of Applicant's translation of the Japanese Patent document 63-128713, an exposure apparatus in which an original (or mask) 24 and a substrate 25 are scanned scynchronously such that the pattern on the original is projected onto the substrate. The first stage or mask stage is the upper portion of frame 26 holding mask 24 (see page 6, line 25, and page 7, lines 1-31). A second stage or substrate stage is the lower portion of frame 26 which moves substrate. A movable frame 35 is considered to be another stage which finely moves either the substrate or the mask by fine feeding

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mechanism 34. Although figure 1 only shows 35 finely moving the substrate 25, page 5, lines 20-23 of the translation of the Japanese Patent Document 63-128713 states "the positional relationship between the mask and the substrate is deviated relative to each other **by using a fine feeding mechanism for the mask or the substrate** in accordance with the scanning position while performing exposure scanning". In other words, **either the mask or the substrate can have a fine feeding mechanism**. Since the only fine feeding mechanism mentioned in the reference is 34 for a movable frame 35, one could thus use movable frame 35 for a second mask stage driven by fine feeding mechanism 34. Page 9, lines 24 and 25, and page 10, lines 1-4 reaffirms this by stating "any distortion is corrected by deviating the positions of the mask and the substrate relative to each other in an optimum displacement pattern determined by measurement conducted beforehand **by a fine feed mechanism for the mask or the substrate**". The measuring means is the alignment optical system 28 and 52 that measures the deviation of the mask stage relative to the substrate stage (see page 7, lines 3-6, page 7, lines 22-25, and page 8, lines 19-23). With respect to claim 143, the adjusting means for adjusting the substrate stage on the basis of the measurement by the measuring means includes fine feeding mechanism 34 (see page 7, line 9, and figure 1) and motors 40, 41, and 42 (see page 7, lines 17-20, and figure 2). Motors 40, 41, and 42 can finely displace substrate 25 in the x, y, and theta directions (unfortunately, element "25" is incorrectly called a mask on line 18 of page 7 of Applicant's translation, and the substrate is erroneously labeled as 24 in several locations of Applicant's

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translation). With respect to claim 149, elements 32 and 33 are linear air bearings (see figures 1 and 2 and page 7, lines 7-8, and page 3, lines 14-18).

5. Claims 143-147, 149, 158-162, and 169-171 are rejected under 35 U.S.C. 102(b) as being anticipated by Matsushita et al (U. S. Patent No. 4,749,867). Matsushita et al discloses in figure 2 an exposure apparatus in which a portion of a pattern on an original (or mask) 1 is projected onto a substrate 3. The original 1 and the substrate 3 are scanned synchronously. A first stage 2 scanningly moves the original 1 and a second stage 4 scanningly moves the substrate 3. The measuring means 41, 43, and 45 measure a deviation of stage 2 relative to stage 4 (see column 4, lines 41-68, and column 5, lines 1-5). The adjusting means includes controller 49 which controls the drive of stage 2 and /or stage 4 on the basis of the detected positional information (see column 5, lines 12-19). With respect to claims 145 and 160, measuring means 45 is an interferometer. With respect to claim 149, column 3, lines 41-43 disclose air-bearings 8.

6. Claims 183 is rejected under 35 U.S.C. 102(b) as being anticipated by Suwa et al (U. S. Patent No. 4,748,478). As noted above, lines 4-6 of claim 183 are indefinite. Suwa et al discloses in figure 1 a first object R and a second object W, both of which are moved. A movable body 7 holds the first object R on an object side of the projection system 12. A first interferometer system 11 (see column 3, lines 40 and 41) is optically connected to the movable

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body 7 and has a plurality of measurement axes L2x and L2y (see column 4, lines 45-47). A plurality of reflection surfaces 10a and 10b are disposed separately on the movable body 7.

Claim Rejections - 35 USC § 103

7. Claims 9-11, 29 - 31, 33, and 163 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Japanese Patent document 63-128713 in view of Torigoe (U. S. Patent No. 4,822,975). The Japanese Patent document 63-128713 discloses substantially the invention claimed except for specifically disclosing projecting the pattern of the original onto the substrate in a reduced scale and scanning the mask and photosensitive substrate at respective speeds corresponding to the magnification. Torigoe discloses in figures 2A and 7 and column 5, lines 40-46, column 7, lines 67-68, and column 8, lines 1-15, that the reflection type projection optical system 5 is not limited to one-to-one magnification, but that it is also applicable to exposure apparatuses of reduced imaging magnification for the well known purpose of putting more circuit components onto a smaller space. In such case, mask M and wafer W are moved in synchronism with each other but at different speeds corresponding to the ratio of the reduced magnification. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide the Japanese Patent document 63-128713 with a means to project a reduced scale pattern on the substrate and scan the mask and photosensitive substrate at respective speeds

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invention claimed in claim 183 except for disclosing a plurality of reflection surfaces disposed separately on the movable body 12. Swan et al discloses a plurality of reflection surfaces 10a and 10b on the movable body (reticle stage) 7 to monitor the movements of the movable body 7 by use of a laser interferometer (see column 3, lines 40-42) of Swan et al for the purpose of more accurate monitoring of the position of the movable body 7. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide Bruning et al with a plurality of reflecting surfaces on the movable body 12 in view of Swan et al for the purpose of more accurate monitoring of the position of the movable body 12.

Allowable Subject Matter

9. Claims 1-8, 23-28, 35-39, 41-43, 45, 48-55, 68-70, 72-74, 76, 79-84, 97-99, 101-103, 105, 108, 109-115, 128 - 142, 156, 157, 168, 179-182, 187, and 189 are allowed. Claims 12-14, 16-20, 22, and 32 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

It noted that any resposne to this action which amends the claims needs to include a supplemental declaration.

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corresponding to the magnification in view of Torigoe for the well known purpose of putting more circuit components onto a smaller space. With respect to claims 29 and 30, page 5, lines 20-23 of the translation of the Japanese Patent Document 63-128713 states "the positional relationship between the mask and the substrate is deviated relative to each other **by using a fine feeding mechanism for the mask or the substrate** in accordance with the scanning position while performing exposure scanning". In other words, **either the mask or the substrate can have a fine feeding mechanism**. In addition, page 2, lines 7-10 of the translation of the Japanese Patent Document 63-128713 states "**while performing the scanning for exposure, the positional deviation between the mask and the substrate is measured**". Finely moving the stage in a rotational direction is disclosed on page 7, line 19. With respect to claim 31, the mask stage can be finely displaced in the theta direction (see page 7, line 19), and the cross marks 54b and 56b as shown in figure 3 would give rotational deviation information

8. Claim 183 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bruning et al (U. S. Patent No. 5,281,996) in view of Swan et al (U. S. Patent No. 4,748,478). Bruning et al discloses in figure 1 a first object 13 and a second object 16. A movable body 12 on the object side of a projection system 11 holds the first object 13. An interferometer 17 monitors the movement of the movable body 12 and the wafer stage 15 (see column 5, lines 32-35). Bruning et al further discloses in column 6, lines 9-11, and column 6, lines 30-34, of simultaneous movements of the first object 13 and the wafer 16. Thus, Bruning et al discloses substantially the

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invention claimed in claim 183 except for disclosing a plurality of reflection surfaces disposed separately on the movable body 12. Swan et al discloses a plurality of reflection surfaces 10a and 10b on the movable body (reticle stage) 7 to monitor the movements of the movable body 7 by use of a laser interferometer (see column 3, lines 40-42) of Swan et al for the purpose of more accurate monitoring of the position of the movable body 7. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide Bruning et al with a plurality of reflecting surfaces on the movable body 12 in view of Swan et al for the purpose of more accurate monitoring of the position of the movable body 12.

Allowable Subject Matter

9. Claims 1-8, 23-28, 35-39, 41-43, 45, 48-55, 68-70, 72-74, 76, 79-84, 97-99, 101-103, 105, 108, 109-115, 128 - 142, 156, 157, 168, 179-182, 187, and 189 are allowed. Claims 12-14, 16-20, 22, and 32 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

It noted that any response to this action which amends the claims needs to include a supplemental declaration.

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10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Alan Mathews at telephone number (703) 308-1706. The examiner can normally be reached on Monday through Friday from 8:00 AM to 4:30 PM Eastern Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Russ, Adams, can be reach on (703) 308-2847. The fax phone number for this Group is (703) 305-34[31,32]. Any inquiry of a general nature or related to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-0956.



Alan A. Mathews
Primary Examiner

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March 22, 2001



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